

REMARKS

Claims 1-3, 5, 6, 9-15, 17, and 36 are pending. Claims 38-46 are canceled to expedite prosecution.

Claims 1-3, 5, 6, 9-13, 15, 17, 36, 38-43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al., U.S. Patent 5,959,307 (hereinafter "Nakamura") in view of Kitagawa et al., U.S. Patent 5,616,937 (hereinafter "Kitagawa") and Mitsui, JP 02254765. Applicants respectfully traverse the rejection.

A. Kitagawa reference**1. The Examiner's Rejection**

Claims 1 and 36 recite "the fixation layer is conductive." Regarding claims 1 and 36, the Examiner states on page 2 of the office action: "Nakamura et al. show a GaN LED . . . with a p-contact that could be Ag . . . but does not show further layers. Kitagawa et al. show a luminescent device . . . that has a p-electrode 16 and a protective film 17 that protects the electrode [from] deterioration Note that Kitagawa et al. show that layer 17 can be ZnS or ZnSSe (column 5, line 10) which is a semiconductor and is therefore conducting."

In the "Response to Arguments" section on page 5 of the office action, the Examiner states "Applicant states that the protective layer 17 of [Kitagawa] et al. is not conducting, which is true but Kitagawa et al. show the use of semiconducting materials, which are conducting, and the conductivity will be a function of the density of the included material. With sufficient density the included material will form a continuous matrix and will conduct. [Nevertheless], [Kitagawa] et al. does suggest the use of a conducting material."

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2. The Examiner's Position Contradicts the Plain Language of Kitagawa

Applicants respectfully submit that the Examiner is mischaracterizing Kitagawa.

a. Kitagawa Clearly States That Layer 17 is Insulating

The only description Applicants have found in Kitagawa regarding the conductivity of protective film 17 is at column 4, lines 65-67, which state "[t]he ultraviolet light transmitting protective film 17, which is disposed to cover both the metal electrode 16 and the current injection layer 14, is an insulating film . . ." (Underlining added.) The underlined portion of this sentence unequivocally states that protective film 17 is insulating. Applicants have found no teaching in Kitagawa that protective film 17 can be conducting or semiconducting, as suggested by the Examiner. Applicants can find no teaching in Kitagawa that protective film 17 is anything other than an insulating layer.

b. The Passage Cited by the Examiner Does Not teach a Conductive Layer

The passage cited by the Examiner reciting ZnS and ZnSSe as possible additions to insulating layer 17 does not contradict the above-quoted statement that layer 17 is insulating. At column 5, lines 11-16, Kitagawa teaches: "With the use of at least one kind of compounds including [list omitted] or with the use of at least one kind of mixtures of these compounds with ZnS or $\text{ZnS}_x\text{Se}_{1-x}$ as the protective film 17, it is possible to obtain a luminescent device with excellent heat resistance (100° C. or less) and excellent moisture resistance (90% or less)." This passage clearly states that materials, including ZnS and ZnSSe, may be added to insulating layer 17 to improve the heat and moisture resistance of the layer, NOT to change the layer from an insulating layer to a conductive layer.

c. The Examiner infers into Kitagawa Teachings which are Not Supported

Applicants respectfully request the Examiner to point out the passage in Kitagawa that supports the Examiner's assertion that "[w]ith sufficient density the included material [i.e. ZnS or ZnSSe] will form a continuous matrix and will conduct." As stated above, ZnS and

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ZnSSe are added to improve heat and moisture resistance of layer 17. Applicants can find no teaching or suggestion that ZnS and ZnSSe are added to convert insulating layer 17 into a semiconducting or conducting layer. Since ZnS and ZnSSe are added for reasons completely unrelated to conductivity, Applicants respectfully submit that the mere mention of possibly semiconducting materials such as ZnS or ZnSSe cannot refute Kitagawa's clear statement that layer 17 is insulating. Further, since the ZnS and ZnSSe are added for reasons unrelated to conductivity, Kitagawa does not even suggest that the ZnS or ZnSSe are added in a state that would be semiconducting, even if the ZnS and ZnSSe were present in sufficient quantity to "form a continuous matrix" as suggested by the Examiner. For these reasons, Applicants respectfully submit that the Examiner's inference that the mention of ZnS or ZnSSe added to an insulating layer for reasons unrelated to conductivity teaches or suggests a conductive layer is clearly not supported by the plain language of Kitagawa.

B. Mitsui reference

1. The Examiner's Rejection

To remedy the deficiencies of Nakamura and Kitagawa, the Examiner cites Mitsui, stating "Mitsui shows (see constitution) that for a solar cell a layer of Au on Ag will prevent deterioration of the Ag. It would have been obvious to protect the electrode as shown by Kitagawa et al. and to use Au as the protective film since it is easier to form than the semiconductor layer of Kitagawa et al." Office Action, page 2.

2. Kitagawa States the Protective Film Must Transmit Light

Applicants respectfully submit that Mitsui's gold layer cannot be substituted for Kitagawa's protective film 17 because Kitagawa states at column 4, line 65 that the film is "ultraviolet light transmitting." Accordingly, the film must transmit light. Applicants can find no teaching or suggestion in Kitagawa or Mitsui that Mitsui's layer can be made light

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transmitting. Accordingly, a person of skill in the art would not be motivated to use Mitsui's gold layer in Kitagawa, and would not expect that Mitsui's gold layer could successfully be used in Kitagawa's device.

3. Mitsui and Kitagawa Address Different Problems and Cannot be Combined

Applicants respectfully submit that Mitsui cannot be combined with Kitagawa because Mitsui's thin Au layer 5 and Kitagawa's protective film 17 serve different purposes, thus there is no motivation to turn to Mitsui to modify Kitagawa. Mitsui's thin Au layer 5 is to "prevent the surface of Ag from deteriorating [by] keeping it from being oxidized or sulfured due to exposure to the air . . . [T]he clean surface of Au is brought into contact with a connector at the welding of the connector, so that the connection of a connector high enough in bonding strength . . . can be realized. By this setup, a current blocking factor caused by oxide or sulfide can be eliminated, so that a stable welding can be made." Mitsui's gold layers thus preserves the electrical path to the silver contact, preventing oxidation or sulfuration that can harm current flow. In contrast, Kitagawa's protective layer is to protect the current injection layer 14 and metal electrode 16 from deteriorating in an atmosphere where ultraviolet light is emitted. Neither Mitsui nor Kitagawa contain any suggestion that a layer designed to improve electrical contact to silver is suitable for protecting device layers from ultraviolet light. Accordingly, there is no motivation to substitute Mitsui's thin gold layer 5 for Kitagawa's protective film 17.

In response to this argument the Examiner states in the "Response to Arguments" section on page 5 of the office action, "Applicant states that [Kitagawa] et al. and [Mitsui] cannot be combined since they use protective layers for different pu[r]poses but note that both show protection from the atmosphere." Kitagawa's protective film is intended to prevent damage caused by exposure to ultraviolet light. Mitsui's gold layer is intended to prevent damage caused by exposure to oxygen or sulfur. Clearly, though both references indeed deal

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with protection from deterioration, the modes of deterioration addressed by each reference are vastly different. Applicants have found no suggestion in either Mitsui or Kitagawa that these two types of deterioration are equivalent, or that these two types of deterioration may be solved by the same structure. Accordingly, Applicants maintain that a person of skill in the art would not turn to Mitsui to modify Kitagawa, since Mitsui and Kitagawa are directed to different problems.

4. Combining Mitsui with Kitagawa Would Create the Very Problem Applicant Seeks to Avoid

In addition, Applicants teach that a diffusion barrier is desirable because “in the absence of a diffusion barrier layer, gold from the bonding layer diffuses into the silver layer and reduces the reflectivity of the silver layer.” See page 7, lines 11-12. Accordingly, substituting Mitsui’s thin gold layer 5 for Kitagawa’s protective film 17 and forming the thin gold protective film on Nakamura’s III-nitride silver contact light emitting device would result in a structure having the very gold-diffusing-into-the-silver-electrode problem that the diffusion barrier of the present invention attempts to remedy.

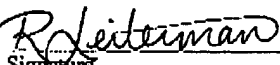
C. Conclusion

As stated above, Mitsui cannot be properly combined with Kitagawa and Nakamura. Kitagawa and Nakamura do not teach “the fixation layer is conductive” as recited in claims 1 and 36. Claims 1 and 36 are thus allowable over the combination of these references. Claims 2, 3, 5, 6, 9, 10, 12-14, 15, and 17 depend from claim 1 and are thus allowable for at least the same reasons as claim 1. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura, Kitagawa, and Mitsui, further in view of Hatano et al. Hatano adds nothing to the deficiencies of Nakamura, Kitagawa, and Mitsui, thus claim 14 is allowable for at least the same reason as claim 1.

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Claims 38-46 are canceled, rendering their rejection moot.

In view of the above arguments, Applicants respectfully request allowance of all pending claims. Should the Examiner have any questions, the Examiner is invited to call the undersigned at (408) 382-0480.

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Respectfully submitted,



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